

REMARKS

The Applicants are filing this Amendment and Response in response to an Office Action mailed on October 4, 2006. At the time of the Office Action, claims 1-30 were pending. By this paper, Applicants have amended claims 1, 5, 9, 16, 23 and 27 for clarification of certain features to expedite allowance. Applicants respectfully assert that these amendments do not add any new matter. No claims are canceled or added herein. Thus, claims 1-30 remain pending. Applicants respectfully request reconsideration and allowance of all pending claims.

Summary of the rejections.

In the Office Action, claims 1-4 were rejected under 35 U.S.C. § 101 as allegedly lacking utility. Claims 1-30 were rejected under 35 U.S.C. § 103 by U.S. Patent No. 5,963,959 to Sun et al. ("the Sun reference") in view of U.S. Patent No. 6,125,360 to Witkowski et al. ("the Witkowski reference"). Each of these rejections is addressed in detail below.

Claim Rejection Under 35 U.S.C. § 101

In the Office Action, the Examiner rejected claims 1-4 under Section 101 as allegedly lacking utility. Specifically, the Examiner stated:

Claims 1-4 are rejected under 35 U.S.C. 101 because of lacking utility. Specifically, no implementation of computer hardware is found in these claims. The lack of computer hardware renders claims 1-4 as being software per se and therefore is nonfunctional descriptive material.

Applicants respectfully traverse the rejection.

Legal Precedent

According to the Supreme Court, congress intended statutory subject matter to “include anything under the sun that is made by man.” *Diamond v. Chakrabarty*, 447 U.S. 303, 308-09; 206 U.S.P.Q. 193, 197 (1980). Indeed, exclusions of statutory subject matter are limited to laws of nature, natural phenomena and abstract ideas. *See Diamond v. Diehr*, 450 U.S. 175, 185; 209 U.S.P.Q. 1, 7 (1981). Other than these specific exceptions, therefore, nearly anything man made is statutorily patentable subject matter under 35 U.S.C. §101.

In determining when process or method claims include statutory subject matter, the Supreme Court in *Diehr* stated that “[t]ransformation and reduction of an article ‘to a different state or thing’ is the clue to the patentability of a process claim that does not include particular machines.” *See id.* 450 U.S. at 183-185, 209 U.S.P.Q. at 6. In addition to the Supreme Court’s transformation and reduction test, the Federal Circuit has developed a second test which may also be used to determine if a claim recites statutory subject matter, namely does the claim produce a “useful, concrete, and tangible result.” *In re Alappat*, 31 U.S.P.Q.2d 1545, 1557 (Fed. Cir. 1994) (*en banc*). The Federal Circuit further elaborated on this second test by holding that one must look to “the essential characteristics of the subject matter, in particular, its practical utility.” *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 47 U.S.P.Q.2d 1596, 1602 (Fed. Cir. 1998).

However, explaining this “useful, concrete, and tangible” test, the Federal Circuit has stated “the dispositive inquiry is whether the claim *as a whole* is directed to statutory subject matter.” *In re Alappat*, 31 U.S.P.Q.2d at 1557. Indeed, there has been no requirement from Congress, the Supreme Court, or the Federal Circuit mandating that a *specific final result* be shown for a claim to qualify under Section 101. *See id.* Rather, the Federal Circuit has

specifically stated “the *Alappat* inquiry simply requires an examination of the contested claims to see if the claimed subject matter *as a whole* is a disembodied mathematical concept representing nothing more than a ‘law of nature’ or an ‘abstract idea,’ or if the mathematical concept has been reduced to *some practical application rendering it ‘useful’*.” *AT&T Corp. v. Excel Communications, Inc.*, 50 U.S.P.Q.2d 1447, 1451 (Fed. Cir. 1999) (emphasis added). Therefore, if a claim meets either the transformation and reduction test put forth by the Supreme Court, or if the claim, read as a whole and in light of the specification, produces any useful, concrete, and tangible result, the claim meets the statutory requirements of Section 101. *See id.*

Applicants respectfully assert that the claims 1-4, taken as a whole, each recite statutory subject matter under 35 U.S.C. §101 because they produce a useful, concrete and tangible result. The present Application is directed to methods and systems for refreshing materialized views, whereby updates to the materialized views are collected in a log and are applied periodically. In accordance with the present technique, as recited by the claims, materialized views may become available for queries during the time in which the materialized views are updated. Such a technique improves the availability of materialized views in databases that employ a deferred refresh policy. *See* Application, paragraph 4.

For example, independent claim 1 recites a system comprising “a materialized view that is derived at least in part from a table; a refresh log that contains a plurality of entries, each of the plurality of entries corresponding to a change in the table, each of the plurality of entries comprising an epoch identifier adapted to synchronize the refresh log between refreshing operations; and a refresh manager that performs a refresh operation on the materialized view in multiple steps.”

Claim 1, therefore, taken as a whole, recites a system allowing a table and a materialized view to be available for queries while the materialized view is being refreshed. The Applicants assert that increasing the availability of the table and of the materialized views during refresh operations of the materialized views is a useful, concrete and tangible result as it enables performing data queries more efficiently. Accordingly, Applicants respectfully request withdrawal of the rejection of claims 1-4 under Section 101.

The Rejection Under 35 U.S.C. § 103

As set forth above, claims 1-30 were rejected under Section 103 as being rendered obvious by the Sun reference in view of the Witkowski reference. The rejection of independent claims 1 and 5 is exemplary, the Examiner stated:

With respect to claims 1, 5, 10, 19, 24, 28, **Sun** discloses A system that allows a table and a materialized view to be available while the materialized view is being refreshed, the system comprising:

'a materialized view (snapshot) that is derived at least in part from a table (master table)' as a snapshot that references a master table (col. 2, lines 24-27). Furthermore, snapshot 400 is derived from master table 200 (col. 5 lines 35-36).

'a refresh log (master log) that contains a plurality of entries (210, 402, and 600), each of the plurality of entries corresponding to a change in the table (master table)' as a master log (drawing references 210, 402, and 600) contains the primary keys corresponding to changes in the master table.

'(b) identifying a second subset of the plurality of entries from within the first subset of the plurality of entries, the second subset of the plurality of entries falling within a primary key value boundary' as selecting primary key values PKI=: and . . . PKn=:n (col. 5, lines 46-62).

'(c) applying the second subset of the plurality of entries to the materialized view (snapshot)' as applying the appropriate refreshed rows to the snapshot table (col. ' 1, lines 35-40, and col. 5, lines 63-67 and col. 5 lines 45-50).

Sun fails to expressly disclose each of the plurality of entries comprising an epoch identifier and the step of

successively reading a first subset of the plurality of entries indicated by a specific epoch identifier from the refresh log.

Witkowski, however, teaches **each of the plurality of entries comprising an epoch identifier'** as an SCN (System Change Number). Each change is associated with the SCN that performed the change (col. 9 lines 17-23).

Witkowski also teaches the step of **successively reading a first subset of the plurality of entries indicated by a specific epoch identifier from the refresh log** as the database query found in column 9 lines 55-60) for determining how a materialized view should be updated in response to updates made in the base table (Witkowski, col. 4 lines 25-30). That is, the SCNs from the time of the last refresh to current are selected.

It would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references because the teachings of Witkowski would have provided Sun's system with determining how a materialized view should be updated in response to updates made in the base table (Witkowski, col. 4 line 25-30). Such teachings would aid and make more efficient the detection of changes made to a table (Sun, col. 2 lines 26-28).

Office Action, pp. 3-5 (Emphasis in original).

Legal Precedent

Applicants respectfully traverse the rejection. The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references

require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

The rejection of claims 1-30 under Section 103 is improper because the Sun reference and the Witkowski reference (either alone or in combination with each other) fail to teach, suggest or illustrate each and every element recited by the Applicants' claims. Accordingly, the combination of Sun with Witkowski, even if proper, cannot render Applicants' claims obvious. By way of example, independent claims 1, 9, 23 and 27 recite a system and a computer readable medium providing availability of a table and a materialized view while the materialized view is being refreshed. Particularly, the claims recite a refresh log containing a plurality of entries, "each of the plurality of entries comprising an epoch identifier *adapted to synchronize the refresh log between refreshing operations.*" (Emphasis added.) Similarly, independent claims 5 and 16 recite a method of refreshing a materialized view derived from a table. Particularly, independent claim 5 recites assigning an epoch identifier to changes made to at least one table, wherein the epoch identifier is "*adapted to synchronize the refresh log*

between refreshing operations.” (Emphasis added). Further, independent claim 16 recites storing a plurality of entries corresponding to changes in the table such that each of the plurality of entries comprises “an epoch identifier *adapted to synchronize the refresh log between refreshing operations.*” (Emphasis added). Such synchronization of the refresh log is beneficial, for example, in avoiding inclusion of records corresponding to transactions that occurred outside a refresh time range or in omitting records corresponding to transactions that actually occurred within a particular refresh time range.

In contrast, neither the Sun nor the Witkowski reference discloses an epoch identifier adapted to synchronize the refresh log between refreshing operations. At best, the Witkowski reference teaches “a System Change Number [SCN]...a logical number assigned to transactions in commit time order.” *See*, Witkowski, col. 9, lines 17-19. However, Witkowski does not teach or suggest a system adapted to utilize the system change number so as to avoid inclusion of records corresponding to transactions that occurred outside a refresh time range or omit records corresponding to transactions that actually occurred within a particular refresh time range. More importantly, the Witkowski reference clearly does not disclose the claimed epoch identifier adapted to synchronize the refresh log between refreshing operations, so as to obtain a system having the aforementioned benefits.

Further, the Sun reference does not cure the deficiencies of the Witkowski reference because it, too, does not disclose an epoch identifier of any kind. This fact is acknowledged by the Examiner. Office Action, p. 4.

For at least these reason, Applicants respectfully submit that the Sun reference and the Witkowski reference, either alone or in combination, fail to teach, suggest or illustrate each

and every limitation set forth in independent claims 1, 5, 9, 16, 23 and 27, as well as those claims dependent therefrom. Accordingly, Applicants respectfully request the Examiner to withdraw the rejection of all claims under Section 103 and indicate all claims to be allowable.

Dependent Claims 3, 8, 15, 22, 26 and 30.

In the Office Action, the Examiner rejected claims 4, 8, 15, 22, 26 and 30 under Section 103 as being obvious in view of the Witkowski reference. Applicants traverse this rejection. Applicants note that apart from being dependent on an allowable base claim, the rejection of dependent claims 4, 8, 15, 22, 26 and 30 is deficient because the Witkowski reference clearly does not teach, suggest or illustrate the subject matter recited in these claims. For example, dependent claim 4 recites "wherein the refresh manager is adapted to distinguish between entries of the second subset of the plurality of entries that have already been applied to the materialized view in previous transactions and entries of the second subset of the plurality of entries that have not been applied to the materialized view in the event of a failure of the refresh operation." In rejecting the above claims, the Examiner pointed to a portion of Witkowski which reads:

The present invention is not limited to any particular type of data container or database architecture. However, for the purpose of explanation, the examples and the terminology used herein shall be that typically associated with relational databases. Thus, the terms "table", "row" and "column" shall be used herein to refer respectively to the data container, record, and field.

Referring to FIG. 1, it illustrates two exemplary tables: table R (110) and table S (112). Table R has two columns, labeled "r.a" and "r.b", and table S has two columns labeled "s.a" and "s.c". To extract data from a table, users can issue queries that select columns from the table and, optionally,

specify a criteria that determines which rows are to be retrieved. For example the SQL query "SELECT s.a from S WHERE s.b=2" requests the values from column s.a of table S for the rows in which the value in column s.b equals 2.

Witkowski, col. 1, lines 28-44.

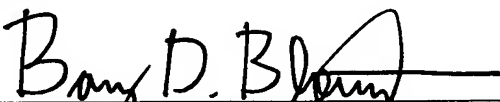
The above disclosure of the Witkowski reference merely relates to terminology and labels employed throughout the text in describing and clarifying certain features, some of which are illustrated in figures disclosed by Witkowski. However, Applicants contend that the above disclosure clearly fails to establish an obviousness rejection because it clearly fails to teach or suggest each and every limitation recited above by dependent claim 4, similarly recited by dependent claims 8, 15, 22, 26 and 30. For at least these reasons, Applicants respectfully assert that dependent claims 4, 8, 15, 22, 26 and 30 are additionally allowable over the combination of Sun and Witkowski.

Conclusion

Applicants respectfully submit that all pending claims should be in condition for allowance. However, if the Examiner wishes to resolve any other issues by way of a telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

Date: January 4, 2007



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